



SELENA DE CARVALHO

RADIUM

Element Symbol: **Ra**

Atomic Number: **88**

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Radium occurs in ores that contain uranium, such as pitchblende. It makes up only about 1 part per trillion of the earth's crust. Radium is one of a chain of radioactive elements produced from the breakdown of uranium by radioactive decay. When radium decays it produces radon gas which in turn produces a number of decay products including polonium, radioactive lead and eventually stable (non-radioactive) lead.

Radium was discovered in 1898 by Marie Curie (1867-1934) and her husband, Pierre Curie (1867-1934). They called the element radium because it gave off such intense radiation it glowed in the dark. It took the Curies many years to prepare one gram of radium by purifying it from more than seven metric tons of pitchblende in the large shed-like laboratory they worked in. Marie, born in Warsaw, Poland in 1867, was awarded a Nobel Prize (her second) in 1911 for her work on radium (and polonium).

Radium sits in Group 2 (IIA) and Row 7 of the periodic table. A brilliant silvery white metal in its pure form, it blackens immediately on contact with air, has an atomic number of 88, a mass of 226 grams per mole (a given number of atoms), a melting point of 700°C, a boiling point of 1140°C and a density of 5.5 grams per cubic centimetre.

There are four isotopes (isotopes are different forms of the same element – they have the same number of protons but a different number of neutrons in their nucleus) of radium in nature. Of these radium-226 is the most abundant and has the longest half-life (time it takes to decay to half the number of atoms) and so is generally the only commercially used isotope of radium.

Radium is luminescent, meaning it gives off radiation that can be seen in the dark. Because of this it was once used to paint the hands and numbers on clocks and watches. The painters used their lips to moisten the brush tips resulting in many cases of cancer caused by the radiation. This led to a class action law suit in the 1920s by a group of young dying women known as the “radium girls” and eventually to laws on protecting the health and safety of workers. Although it can cause cancer, radium, and its decay product radon, were used in the past to treat cancer and were even sold as beauty and health enhancing products. Radium is still used to treat some cancers but these days other radioactive elements are commonly used instead. Only about 2 kg of radium is now produced globally each year, mainly for the purpose of producing radon gas.

Radium was intermittently mined for medical purposes in Australia between 1906 and 1932 from Australia's first uranium mine, “Radium Hill” in South Australia. The amount of radium extracted was very small and the mining of radium proved not to be economically viable. In 1911 radium was worth £13,000 per gram. Less than half a gram of radium bromide was produced that year at the NSW Hunter's Hill refinery using product from the soon to close Radium Hill mine.

Provided by the element sponsor Michelle Iles

ARTISTS DESCRIPTION

Looking into the historical uses and values of radium I was intrigued by this element's broad application both within medicine and commercially for its luminescence. The print I created is digitally composed from layers of scanned etchings.

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